

REMARKS

The following claims are pending in the application: 1 – 59

The following claims have been amended: 1, 4 – 6, 18, 20, 22, 25, 30 and 31

The following claims have been deleted or
withdrawn: 3, 11 – 16, 27 and 34 - 59

The following claims have been added: none

As a result of the foregoing Amendment, the following claims remain pending in the application: 1, 2, 4 – 10, 17 – 26 and 28 - 33.

Amendments to the Specification

Applicants have amended the specification to replace the title to more accurately reflect the invention currently claimed, and without prejudice.

Applicants also hereby state that the replacement specification originally submitted on June 7, 2004 contains no new matter, as required by 37 C.F.R. 1.125(b). Accordingly, Applicants respectfully request that the specification originally submitted on June 7, 2004 be accepted as compliant with 37 C.F.R. 1.125(b) and (c).

The Rejection under 37 C.F.R. 112, Second Paragraph

The Examiner has rejected claims 1, 2, 4 – 11, 17 – 26 and 28 – 33, alleging them to be non-compliant with as 37 C.F.R. 112, second paragraph.

With respect to claim 1, Applicants have amended claim 1 as the Examiner has suggested.

With respect to claims 4 and 5, Applicants have amended these claims editorially to correct obvious grammatical errors. Applicants respectfully submit that these claims now clearly point out that the deposited gallium arsenide has the described smoothness variation parameters as indicated. These smoothness parameters are defined as a variation in smoothness over distance as would be understood by one of ordinary skill in the art.

With respect to claim 6, Applicants have amended this claim to more clearly indicate that reference is indeed intended to the laser set forth in claim 1.

With respect to claim 18, Applicants have amended this claim in accordance with the helpful suggestion of the Examiner.

With respect to claims 20 and 22, Applicants have amended these claims editorially to more clearly point out that the surface referred to is the target and substrate surface, respectively, that defines the plane within which the target and substrate surface, respectively, are moved.

With respect to claims 30 and 31, Applicants have amended these claims editorially to more clearly point out that the surface referred to is the target and substrate surface, respectively, that defines the plane within which the target and substrate surface, respectively, are moved.

The Rejection under 35 U.S.C. 102

The Examiner has rejected claims 1, 2, 4 – 11, 17 – 26 and 28 – 33, alleging them to be anticipated by obvious over U.S. Patent No. 6,110,219 to Haruta et al.

In this regard, the Examiner has taken the position that the Haruta et al. reference teaches all of the material aspects of the claimed invention, or that the aspects of the claimed invention not so taught would have been obvious to one of ordinary skill in the art as a matter of routine optimization.

Applicants respectfully submit that the present invention is neither anticipated by nor obvious in view of the Haruta et al. reference.

Applicants respectfully submit that the present invention resides in the achievement of the layering of gallium arsenide onto a silicon substrate that achieves substantially stoichiometric deposition, such that the quality of the layered composite is greatly improved. The present invention also includes the achievement of the layering of gallium arsenide onto a silicon substrate that achieves an improved degree of smoothness. This is achieved through the use of a combination of sufficiently high laser fluence and short deposition distance to take advantage of an explosive

Applicant respectfully submits that the Haruta et al. reference does not teach or suggest the method of the present invention, nor are the results of the present invention achieved through the application of this reference.

Applicants respectfully submit that the present invention achieves these unexpected results by taking advantage of an explosively fast transport of the gallium arsenide onto the silicon substrate. It has been found that the event is so fast that the

target material is not afforded sufficient time to disproportionate and the ablated material condenses as a stoichiometric thin-film on the substrate.

Applicants respectfully submit that the Haruta reference teaches only the formation of a plume of material which by its nature is non-uniform in comparison to the uniformity achieved in the present invention. For instance, Figure 2 of the Haruta reference shows the disuniformity of the plume intensity 15 as brought about by beam 16. This effect of producing a plume is shown throughout the figures of the Haruta reference. See e.g. Figures 14, 16A, 17 – 19, 31A and 31B of the Haruta reference. All of these views show the disuniformity inherent in the plume created by Haruta.

Applicants respectfully submit that the Haruta reference does not teach or suggest how one ordinary skill might optimize the method it discloses as there is no teaching or suggestion to create an explosively fast deposition, nor any recognition that the creation of such an explosively fast deposition would lead to the otherwise unexpected results achieved by Applicants. This aspect of the present invention is also expressly set forth in claim 6 and in claim 25.

Applicants further respectfully request reconsideration of claims 4, 5 and 25 which further specify the level of smoothness that may be obtained through the method of the present invention. This aspect of the invention is also not taught or suggested by the Haruta reference that does not suggest this aspect of the invention or how its method might be optimized to obtain these results.

Accordingly, there is not teaching or suggestion contained in the Haruta reference that would lead one to modify its method to achieve the unexpected results in terms of the

stoichiometric nature of the deposition and the smoothness that may be obtained in the deposited layer.

In addition, while cases cited by the Examiner stand for the proposition that changes in reaction parameters such as temperature, might not be a patentable modification, the combination of the applied energy to obtain an explosive deposition, together with a relatively short distance between the target and substrate creates rapid deposition that yields the unexpectedly improved results in terms of the stoichiometry and smoothness of the deposition, as reported in the specification. Unlike the normal effects of temperature or concentration, the effect of explosive deposition is not at all recognized in the prior art, and its effect could not be predicted from its teaching.

The Double Patenting Rejection

The Examiner has rejected claim 9 as be a duplicate of claim 11. Applicants have cancelled claim 11 without prejudice to remove this grounds for rejection.

CONCLUSION

In view of the foregoing amendment and accompanying remarks, the Applicants respectfully submit that the present application is properly in condition for allowance and may be passed to issuance upon payment of the appropriate fees.

Telephone inquiry to the undersigned in order to clarify or otherwise expedite prosecution of the subject application is respectfully encouraged.

Respectfully submitted,

Date:

January 12, 2007

By:



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